

Shopping for Tools

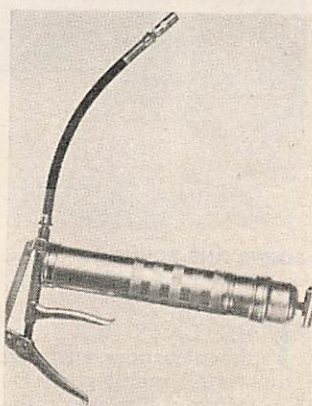
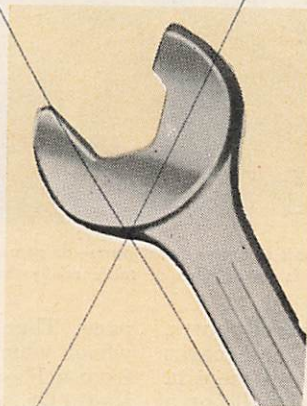
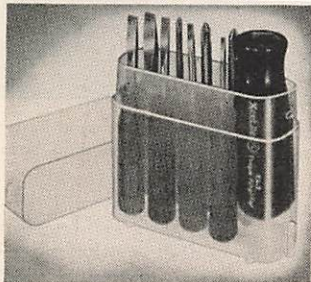
By Arthur J. Maher

HAIRLINE ACCURACY in placing layout marks is said to be easy with this optical center punch. After scribing the work surface, you line up the bushing magnet by means of an eyepiece, then insert the punch and tap. Retail for \$11.10, from Spray-on Products, Inc., 26300 Fargo Ave., Bedford Hts., O.

MIDGET SCREWDRIVERS come in a set of 5 slot-tip ($3/32$ to $1/4$ in.) and 3 Phillips (Nos. 0, 1, 2). A special handle is also supplied, to be slipped on when extra torque is required. Sold in pocket plastic case for \$6.25. Excelite, Inc., Orchard Park, New York

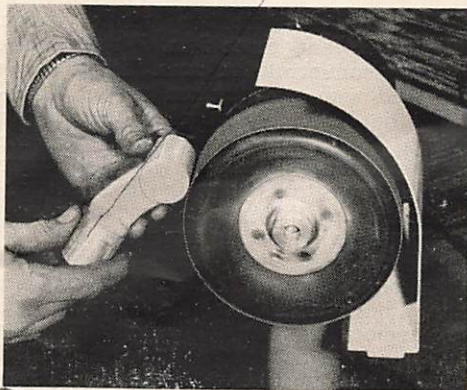
NEW WRENCH speeds jobs on any tubing line assembled with flare nuts. One end is a standard six-point box for final tightening, the other (below) a ratcheting opening. Sizes are $3/8$, $7/16$, $1/2$ and $9/16$ in., priced from \$2.50. Bonney Tools, Alliance, O.

ONE-HANDY GREASE GUN is a heavy-duty, refillable unit that could pay for itself in saved car-lube expenses. Handles easily, develops high pressure. Sells for \$10.95 with hose and all-purpose coupling. General Grease Corp., Box 7243 Kansas City, 13A, Mo.

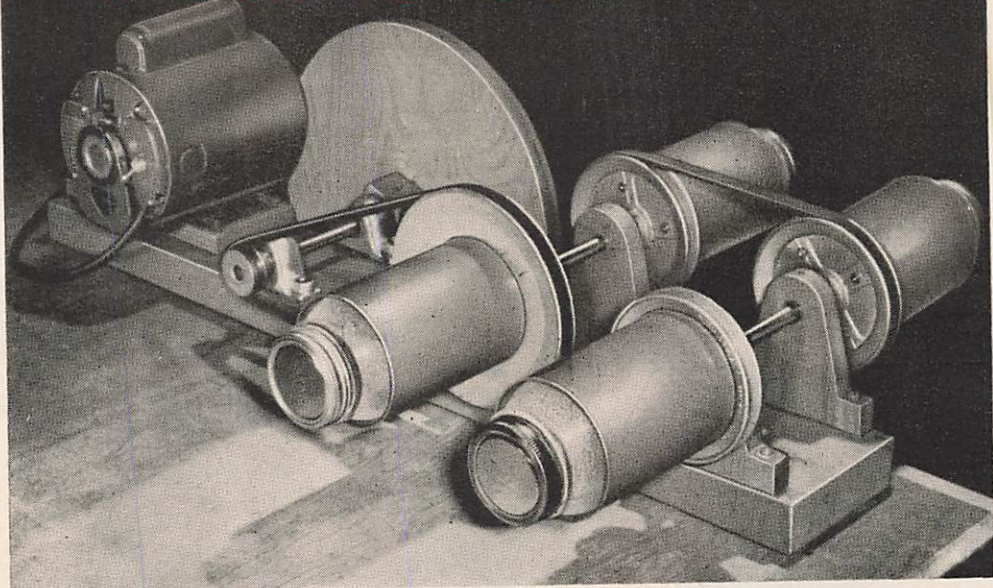


COOL GRINDER: Instead of solid grinding wheels, this machine uses small abrasive belts supported by inflated rubber wheels. This reduces heat build-up in the object being ground. Also permits faster stock removal. Prices start at \$59.50 each, from Nu-Matic Grinders, Inc., 875 E. 140 St., Cleveland 10, Ohio

PORTABLE 5-GAL. MIXER can be powered by any $1/4$ -in. electric drill. Manufacturer claims it will mix enough mortar or concrete for small construction and repair jobs as fast as a man can use it. Inside of drum is equipped with fins, to assure thorough mixing. Costs \$10. MIXIE, Box 158, Mooresville, Ind.



QUART-SIZE 4-GANG TUMBLER



ROUND AND ROUND go four quart jars of small metal parts—or gemstones. Abrasive agents (or steel balls) do the polishing and burnishing. Unit is set at edge of table so flywheel can extend below mounting base

THE LAZY WAY to remove burrs, sharp corners, rust and machine marks from small metal parts is to load them in a rotating container with steel balls or a granular abrasive. Since the burnishing is automatic, it spares you tedious hand work. And tumbling is often more uniform and thorough.

The system has long been used for polishing gemstones, since this must be a slow, steady process stretching over days or weeks. With this ganged tumbler, you can work four different materials at once—or charge the four containers with various types of burnishing or polishing abrasives to take care, simultaneously, of several *stages* in the treatment of a single material. Lazy? Let's just say practical.

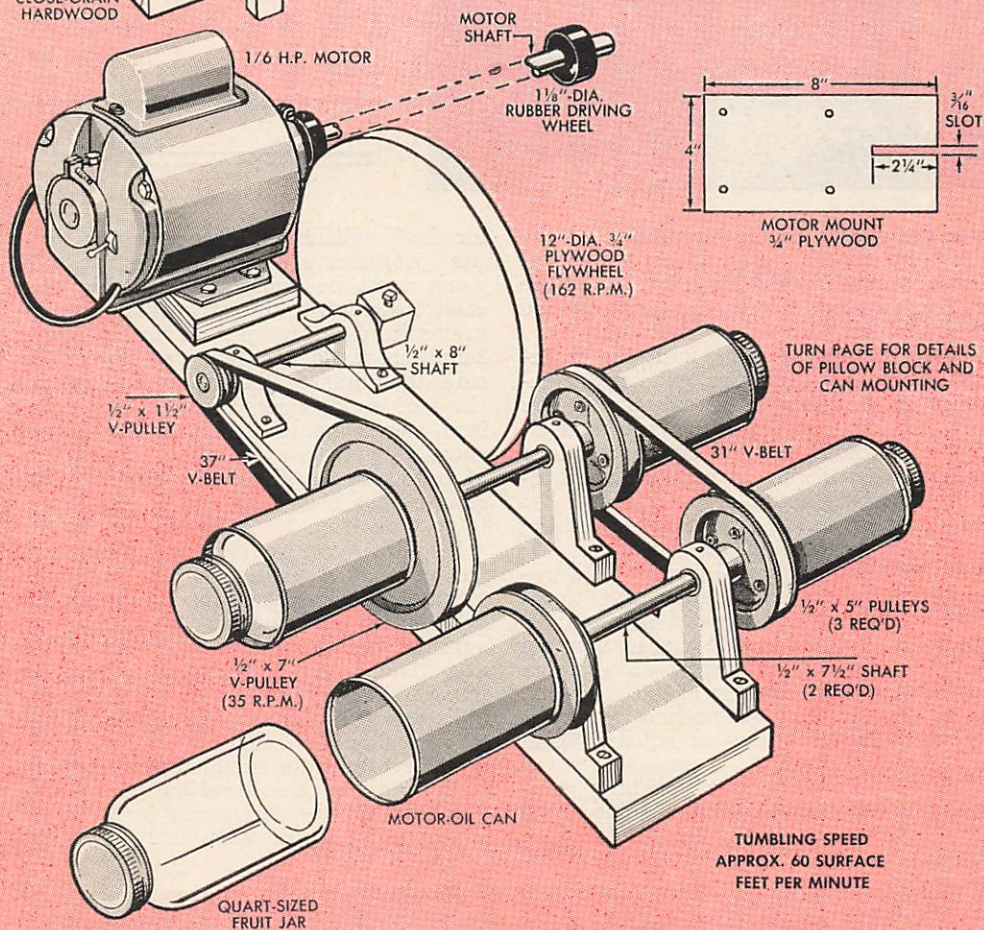
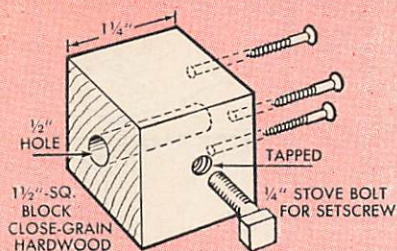
Each jar is filled from one-half to two-thirds of its capacity with a "charge". The burnishing or polishing additives vary in volume up to twice that of the work. The jars rotate approximately 34 r.p.m. to give a tumbling speed of about 60 surface feet per minute (s.f.p.m.) for quart fruit jars.

To make the tumbler, start with the base, locating the positions of the three shafts as shown at the bottom of the next

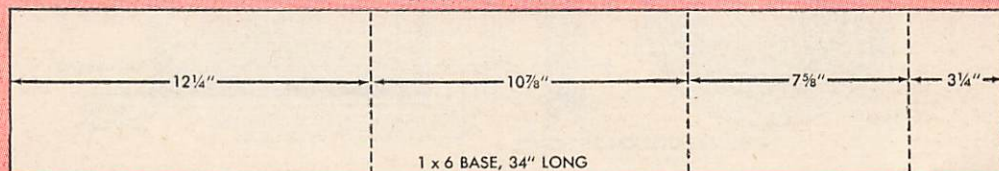
page. Then cut the 12-in. plywood flywheel which is to be driven by friction from a 1 $\frac{1}{8}$ -in. rubber wheel on the motor shaft. Or, you can substitute 14-in. and 1 $\frac{1}{2}$ -in. V-pulleys plus a V-belt. The latter arrangement will result in less vibration and noise than a plywood wheel having slight peripheral irregularities. Next, cut wooden pillow blocks (detail page 196) and fit them with brass bushings, drilled to admit oil. Screw the blocks to the base at the positions indicated and fit with shafts. Or substitute two grinder heads.

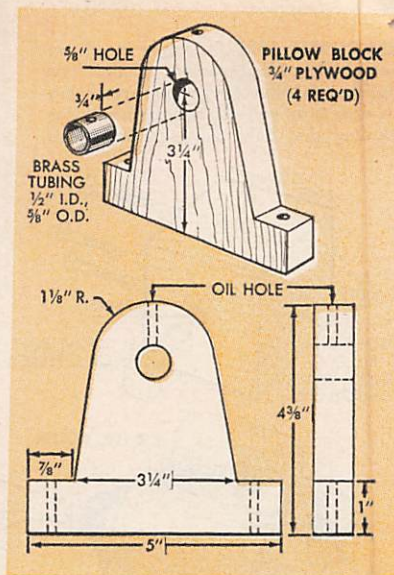
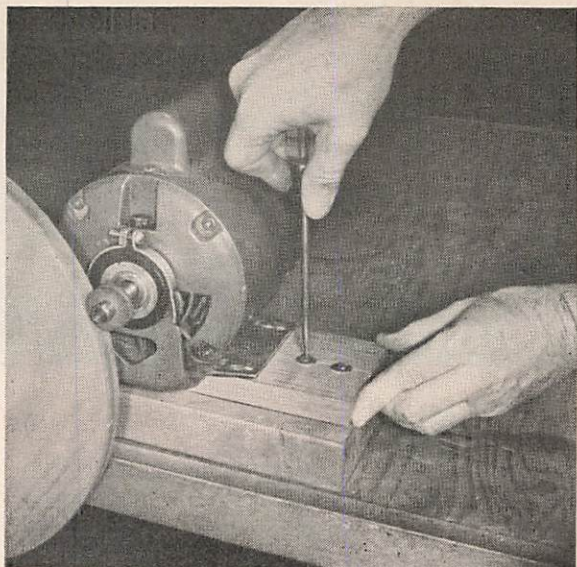
One 7-in. and three 5-in. V-pulleys are used for mounting the cans. The tops are removed with a rotary can opener. Sandwich the bottom of each can between a pair of $\frac{1}{4}$ -in. hardboard disks turned for a snug fit inside the can. One disk has a stepped edge to fit over the beveled portion adjoining the flat center area of most 5-in. pulleys. You can turn some or all of the disks at the same time by mounting them on a threaded arbor. As fruit jars sometimes vary slightly in diameter you must select jars that fit the cans properly. Both round and flattened jars can be used. The corners on the latter aid in turning

REMOVABLE JARS fit snugly in oil-can sockets bolted at centers of the four pulleys. Friction keeps jars revolving as cans turn, yet jars pull out easily for loading and unloading tumbled items



DOTTED LINES SHOW CENTER-TO-CENTER SPACING OF SHAFTS





over the charge as the jar rotates.

A 1/4-hp. motor was used on the model shown; it was fastened to a 4 x 8-in. piece of 3/4-in. plywood slotted to pass two wood screws which position it (photo above).

Tumbling speeds vary with the materials being finished. For polishing gemstones of the baroque or cabochon types (with suitable abrasives), a speed of 60 s.f.p.m. is sufficient. The first three or four consecutive polishing operations each require about 50 hours of tumbling at the above speed, and the final fine polishing step requires from 120 to 150 hours. For light burnishing of metal parts with hardened steel balls, which is the conventional technique, a tumbling speed of about 90 s.f.p.m. is used. For more vigorous action the speed may be increased to 250 s.f.p.m. To obtain speeds in excess of the 60 s.f.p.m. on the gang tumbler shown here, you simply put a larger pulley or rubber wheel on the motor shaft.

The abrasives used for polishing gemstones usually are silicon carbide, Nos. 100, FFF, 600 and 1200 grit, and tin oxide

for final polishing. Successive tumblings use progressively finer abrasives. The work must be washed thoroughly after each operation to prevent coarse abrasive grains from getting in with the finer ones. Tumbling is done either wet or dry. Besides the abrasive, the charge may contain chips of wood, pieces of felt, leather, cast iron, steel slugs or steel balls. In the first stage of gemstone tumbling the addition of iron screws (about 20 percent of the charge) has been found to decrease tumbling time from 15 to 20 percent.

In burnishing small metal parts with hardened steel balls, a rolling and hammering action replaces abrasive wear. The balls flatten the minute ridges on the work surfaces. Small balls contact more surface area than larger balls but also have less impact. Therefore you use the largest balls practical for the work. The volume of balls should be about twice that of the work. Soapy water is added until it stands slightly above the level of the charge. Frothing can be prevented by adding a few drops of liquid detergent. ★ ★ ★

